

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

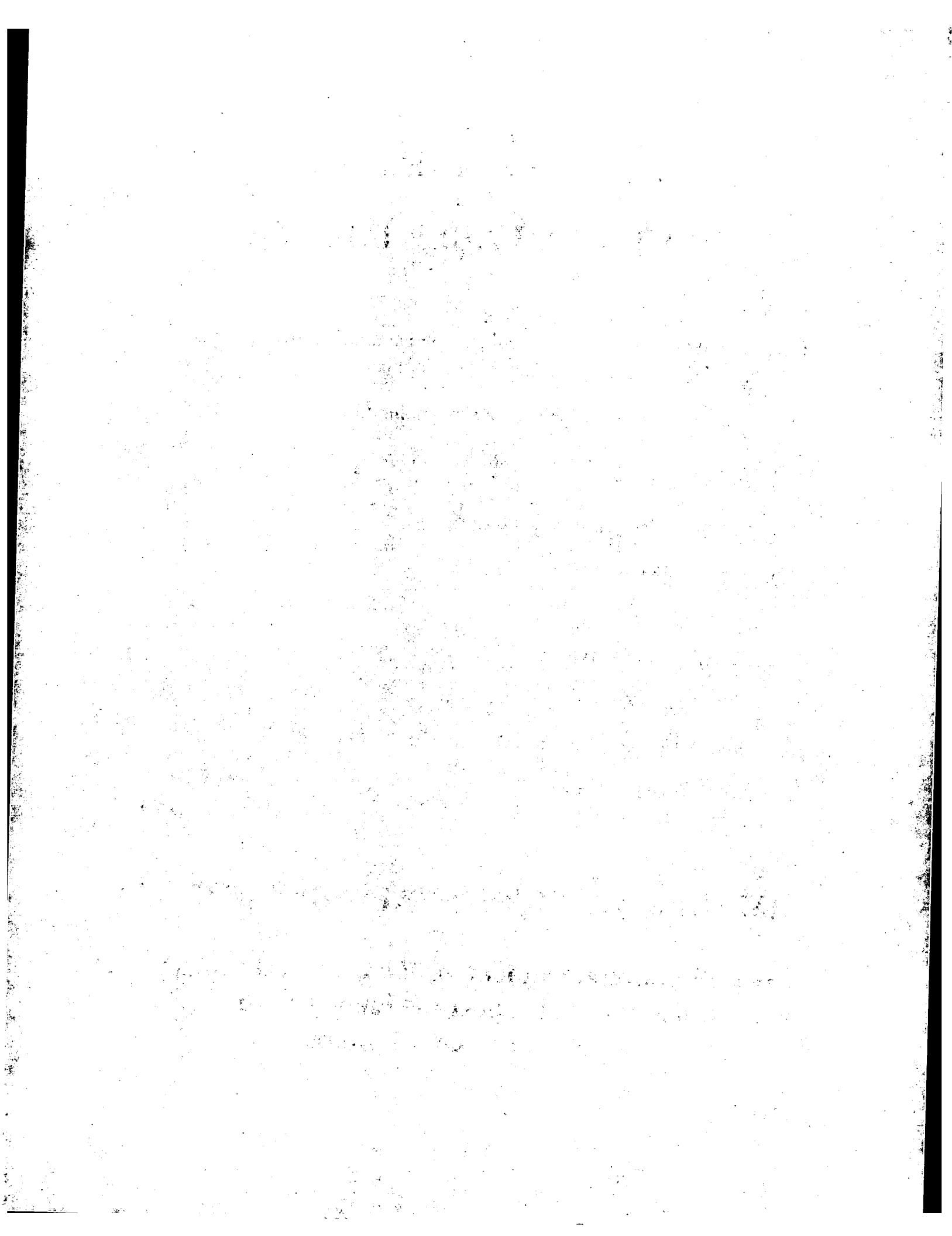
Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**





(19) Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) EP 1 025 911 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:

09.08.2000 Bulletin 2000/32

(51) Int. Cl.⁷: B05B 15/04

(21) Application number: 00300857.0

(22) Date of filing: 03.02.2000

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 03.02.1999 US 243925

(71) Applicant:
Epsi-Engineered Products & Services Inc.
Brookfield, Wisconsin 53005 (US)

(72) Inventor: Sarajian, Kissak T.
Glendale, CA 91202 (US)

(74) Representative:
Gillam, Francis Cyril
SANDERSON & CO.
34, East Stockwell Street
Colchester Essex CO1 1ST (GB)

(54) High temperature resistant target masking devices

(57) A high temperature resistant masking device comprising a substrate having a top surface and a bottom surface, with an adhesive applied to the bottom surface of the substrate for removable attachment of the masking device to a surface to be masked. The masking device includes a transparent substrate with a plurality of markings embossed or printed on the top surface of the substrate to facilitate accurate placement and precision alignment of the masking device on the masking surface. The masking devices are die-cut from sheet material into various shapes and sizes, and placed on a release liner so that they may be readily applied to the surfaces of various parts requiring masking during liquid coating, powder coating, plating or electroplating.

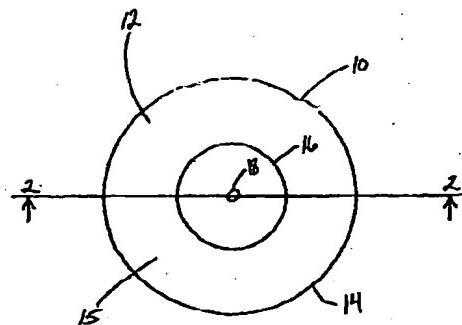


FIG. 1

EP 1 025 911 A2

Description

[0001] The present invention relates to masking devices, and more particularly, to high temperature resistant masking devices having target markings applied thereon to facilitate placement of the masking devices on precision masking areas.

[0002] Masking plays a vital role in the painting or coating of parts used in the automotive, aerospace, electronics and other industries. The painting or coating of parts may involve liquid coating, powder coating, plating or electroplating. The coating may be applied by a variety of methods including brushing, rolling, spraying, dipping, flow-coating, electro-static coating, and submersion in deposition tanks. The liquid, powder or plating material may be applied to wood, fiberglass or metal surfaces in order to protect and strengthen those surfaces. The coating protects the surface of a part by preventing electrical leakage, oxidation, corrosion and decay. Once the coating is applied, it is often cured at temperatures between 200-600° Fahrenheit (93 - 316°C) to harden and cross-link the coating on the surface. After the curing process is complete, the cured coating forms a very strong protective layer on the surface that is highly resistant to scratching and chipping.

[0003] In most applications, a protective coating is applied to certain areas of a surface but not to other areas of the surface. The areas where the coating is not to be applied must be covered or masked off. Typically, a paper or polyester film element in the form of masking tape is applied to the surface areas to be masked. The masking tape generally has an adhesive on one side so that it may be affixed to the masking surface. Once the painting or coating process has been completed, the masking tape is removed from the masked surface.

[0004] There are problems associated with masking areas of a surface during painting or coating. First, the masking devices must often withstand high curing temperatures of approximately 200-600° Fahrenheit (93 - 316°C). Secondly, many masking jobs require precision placement of the masking devices on certain types of components or parts where precision placement of the masking device is critical. Typically, these components include electronic, aerospace or medical devices with very small masking tolerances.

[0005] Thus, it is desirable to provide high temperature resistant masking devices with target markings applied thereon to facilitate placement of the masking devices on precision masking areas requiring a high degree of placement accuracy.

SUMMARY OF THE INVENTION

[0006] The present invention provides masking devices for masking certain areas of a surface during liquid coating, powder coating, plating or electroplating. The masking devices are preferably die-cut from sheet material into substrates, an adhesive is applied to the

bottom surface of the substrates, markings are applied to the top surface of the substrates, and the substrates are affixed to a release liner. The masking devices are then removed from the release liner and applied to a masking surface. The markings assist in properly aligning the masking devices on the masking areas.

[0007] The masking devices comprise a substrate having a top surface and a bottom surface, with an adhesive applied to the bottom surface. A plurality of target markings are applied to the top surface of the substrate to facilitate accurate placement and precision alignment of the masking devices on a masking surface. The substrate is preferably transparent with the target markings either embossed into the top surface of the substrate or printed on the top surface of the substrate. Since the substrate is transparent, it is easy for a person to look through the substrate at the precision masking area to line up the target markings embossed or printed on the top surface of the substrate with the masking area. The masking devices are transparent with target markings applied to its top surface for use in precision placement on the masking area.

[0008] The method of making the masking devices involves die-cutting a sheet of flexible transparent material into desired substrate shapes, applying adhesive to the bottom surface of the die-cut substrates, applying a plurality of target markings on the top surface of the substrates, and applying the marked substrates to a release liner for use in masking surface areas of parts that are to be painted or coated.

[0009] Various other features, aspects and advantages of the invention may be apparent to those skilled in the art from the following drawings and detailed description of preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS**[0010]**

Fig. 1 is a top plan view of a first embodiment of a masking device in accordance with the present invention.

Fig. 2 is an enlarged side view of the masking device taken along line 2-2 of Fig. 1.

Fig. 3 is a perspective view of a plurality of the masking devices of Fig. 1 affixed to a release liner. Fig. 4 is a top plan view of a second embodiment of a masking device in accordance with the present invention.

Fig. 5 is an enlarged side view of the masking device taken along line 5-5 of Fig. 4.

Fig. 6 is a perspective view of a plurality of the masking devices of Fig. 4 affixed to a release liner.

Fig. 7 is a top plan view of an irregularly shaped masking device in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The present invention provides masking devices that are used for masking off areas of a surface during liquid coating, powder coating, plating or electroplating. The masking devices are die-cut into various shapes and sizes, and placed on rolls of release liner so that they may be readily used for masking. The masking devices are removed from the release liner and applied to the surface areas to be masked.

[0012] Fig. 1 shows a first embodiment of a masking device 10 having target markings 16 and 18 applied to device 10. The device 10 is used for masking surfaces of a part that require precision placement of the masking device on areas having very small masking tolerances. The masking device 10 preferably consists of a polyester film substrate 15 having a top surface 12 and a bottom surface 14. Adhesive is applied to the bottom surface 14 so that the masking device may be affixed to the masking area.

[0013] The masking device 10 can be of any shape and size, the circular shape shown in the drawings is only one example. The masking device 10 is preferably made of a thin flexible transparent material such as vinyl, polyester, mylar, kapton, etc. The target markings 16 and 18 are shown as concentric circles in Fig. 1, but may be of any necessary pattern or shape to accommodate the masking task.

[0014] Fig. 2 shows an enlarged side view of the masking device 10 along line 2-2 of Fig. 1. The target markings 16 and 18 are embossed on the top surface 12 of masking device 10. The markings 16 and 18 are used for assisting in accurate placement of the masking device 10 on a masking area having very small tolerances. In other words, the markings 16 and 18 are used to align the masking device on the masking area.

[0015] The masking device 10 is preferably made of a high temperature resistant polyester substrate 15 having a top surface 12 and a bottom surface 14. A silicon adhesive (not shown) is preferably applied to the bottom surface 14 so that the masking device 10 may be removably applied to a surface to be masked. The target markings 16 and 18 printed on the top surface 12 of masking device 10 to assist in properly aligning the masking device 10 on the masking area. It is also preferable that the masking device 10 be transparent so that the user may see through the masking device to properly place the masking device on the surface area to be masked. The transparency of the masking device 10 and the embossed markings 16 and 18 allow the masking device to be used on parts having very small masking tolerances. The embossed markings 16 and 18 are pressed into the top surface of the substrate with a metal press or the like to create the creases 16 and 18 in the substrate as shown in Fig. 2.

[0016] The masking device 10 is preferably circular in shape with embossed concentric circles 16 and 18 acting as target markers. However, it is possible for the

masking device 10 to be die-cut into a variety of shapes and sizes with variously configured target markers. Also, the markings can comprise any necessary pattern or shape required by the masking task.

[0017] Fig. 3 shows a plurality of masking devices 10 applied to a release liner 30. The release liner 30 has a coating on its top surface 32 that allows the masking devices 10 to be easily removed from the release liner for attachment to the masking area of a part that is to be painted or coated. The release liner provides an easy way to package the masking devices for sale and use.

[0018] The masking devices 10 are die-cut from sheets of polyester film material to form substrates of various shapes and sizes. Adhesive is applied to the bottom surface of the die-cut substrates and target markings are embossed on the top surface of the substrates. The embossed substrates are then placed on the release liner 30 and rolled up into rolls to be used by various industries that require precision masking devices for various powder or liquid coating processes.

[0019] Fig. 4 shows a second embodiment of a masking device 100 having target markings 116 and 118 applied on the device 100. The device 100 is used for masking surfaces of a part that require precision placement of the masking device on areas having very small masking tolerances. The masking device 100 preferably consists of a polyester film substrate 115 having a top surface 112 and a bottom surface 114. Adhesive is applied to the bottom surface 114 so that the masking device may be affixed to the masking area.

[0020] Fig. 5 shows an enlarged side view of the masking device 100 along line 5-5 of Fig. 4. The target markings 16 and 18 are printed on the top surface 112 of the masking device 100. The markings 116 and 118 are used to assist a user in accurate placement and alignment of the masking device 100 on a masking area having very small tolerances.

[0021] The masking device 100 includes a substrate 115 preferably made of polyester film with a top surface 112 and a bottom surface 114. A silicon adhesive is preferably applied to the bottom surface 114 so that the masking device 100 may be removably applied to a surface to be masked. The masking device 100 is also provided with printed markings 116 and 118 in order to properly align the masking device 100 to the masking area. It is also preferable that the masking device 100 be transparent so that the user may see through the masking device to properly place the masking device on the masking area to be masked. The transparency of the masking device 100 and its printed markings 116 and 118 allow it to be used for precision masking of various parts requiring very small masking tolerances.

[0022] The masking device 100 is preferably circular in shape with printed concentric circles 116 and 118 acting as the target markers. However, it is possible for the masking device 100 to be die-cut into a variety of shapes and sizes with variously configured target mark-

ers.

[0023] Fig. 6 shows a plurality of masking devices 100 applied to a release liner 130. The release liner 130 has a coating on its top surface 132 that allows the masking devices 100 to be easily removed from the release liner for attachment to the masking area of a part that is to be painted or coated. The release liner provides an easy way to package the masking devices for sale and use.

[0024] The masking devices 100 are die-cut from sheets of polyester film material to form substrates of various shapes and sizes. Adhesive is applied to the bottom surface of the die-cut substrates and target markings are printed on the top surface of the substrates. The printed substrates are then placed on the release liner 130 and rolled up into rolls to be used by various industries that require precision masking devices for powder or liquid coating.

[0025] A plurality of target markings are printed on the top surface of the transparent substrate to facilitate critical placement and precision alignment of the masking device on the surface to be masked.

[0026] The markings are printed on the top surface of the substrate by any typical printing process such as rotary printing, lithographic printing, flexographic printing, laser printing, or screen printing, etc. The ink used may be any suitable dye or pigment bearing liquid that will adhere to the polyester top surface of the masking device. Also, the ink used should be clearly legible on the masking device, so that it may aid in the placement of the masking device on a masking surface. Any suitable ink that will adhere to the polyester surface of the masking device will do.

[0027] Fig. 7 shows an irregularly shaped masking device 134 having target markings 136, 138, 140, 142 placed at arbitrary locations on the top surface of the masking device in order to exactly position the masking device 134 on a precision masking area. The device 134 illustrates that the masking device can be of any shape or size with target markings embossed or printed on the top surface of the substrate. The target markings 136, 138, 140, 142 can also be of any shape or size, and can be located anywhere on the top surface of the substrate.

[0028] It is recognized that various alternatives and equivalents may be apparent to those skilled in the art. Thus, the following claims should be interpreted to cover such alternatives, modifications and equivalents.

Claims

1. A masking device comprising:

a substrate having a top surface and a bottom surface;
an adhesive applied to the bottom surface of the substrate for removable attachment of the substrate on a masking surface; and

a plurality of markings applied to the top surface of the substrate for assisting in accurate placement of the masking device on the surface to be masked.

- 5 2. The masking device of claim 1 wherein the substrate is transparent.
- 10 3. The masking device of claim 1 or claim 2 wherein the plurality of markings are target markings embossed or printed on the top surface of the substrate.
- 15 4. The masking device of any of claims 1 to 3 wherein the substrate is die-cut from sheet material into various shapes and sizes.
- 20 5. The masking device of any of claims 1 to 4 wherein the substrate is made of polyester film.
- 25 6. The masking device of any of claims 1 to 5 wherein the substrate is made from a material which is high temperature resistant.
- 30 7. The masking device of any of claims 1 to 6 wherein the substrate can withstand temperatures of approximately 200-600° Fahrenheit (93 - 316°C).
- 35 8. The masking device of any of claims 1 to 7 wherein the adhesive is a silicone adhesive.
- 40 9. The masking device of any of claims 1 to 7 wherein the adhesive is a rubber based adhesive.
- 45 10. The masking device of any of claims 1 to 9 wherein the marked substrate is placed on a release liner for application to a masking surface.
- 50 11. A method of making a masking device comprising the steps of:

die-cutting a substrate from sheet material, the substrate having a top surface and a bottom surface;
applying a plurality of target markings to the top surface of the substrate;
applying an adhesive to the bottom surface of the substrate; and
applying the substrate to a release liner for removable attachment of the substrate to an area of a part to be masked.
- 55 12. The method of claim 11 wherein the substrate is transparent.
- 60 13. The method of claim 11 or claim 12 wherein the substrate is die-cut into various different shapes and sizes.

14. The method of any of claims 11 to 13 wherein the step of applying a plurality of target markings to the top surface of the substrate comprises embossing or printing the target markings on the top surface of the substrate.

5

15. The method of any of claims 11 to 14 wherein the substrate can withstand temperatures of approximately 200-600° Fahrenheit (93 - 316°C).

10

15

20

25

30

35

40

45

50

55

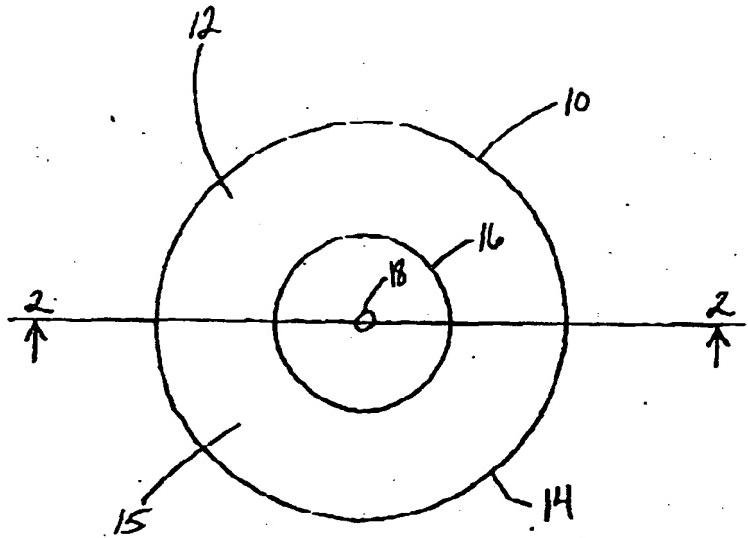


FIG. 1

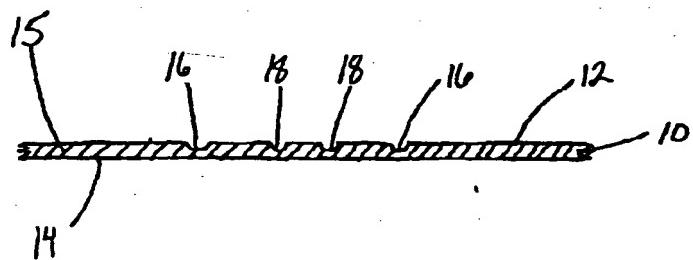


FIG. 2

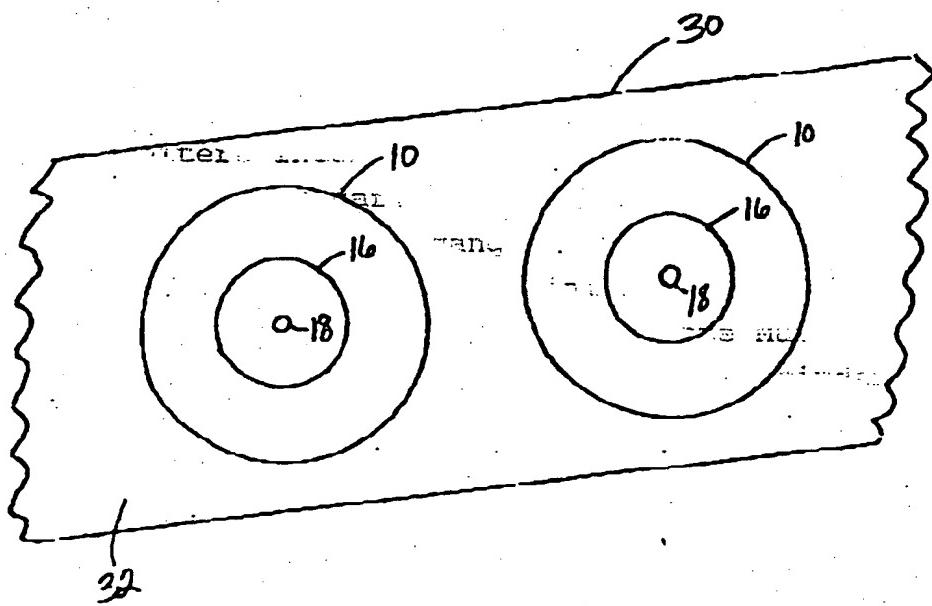


FIG. 3

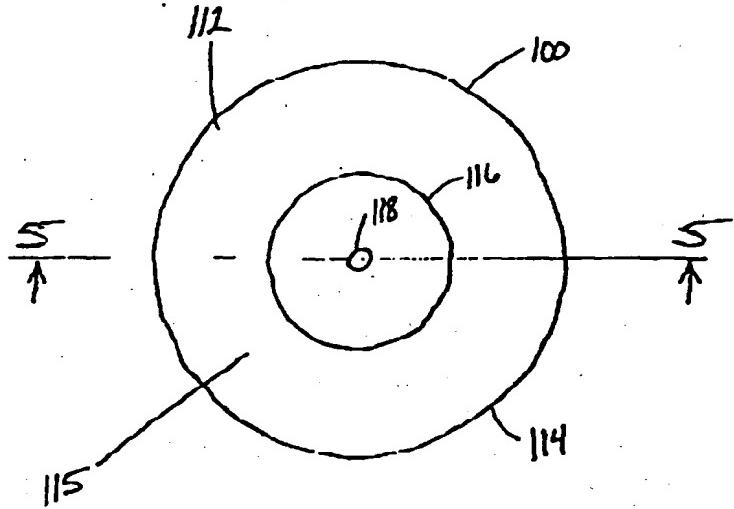


FIG. 4

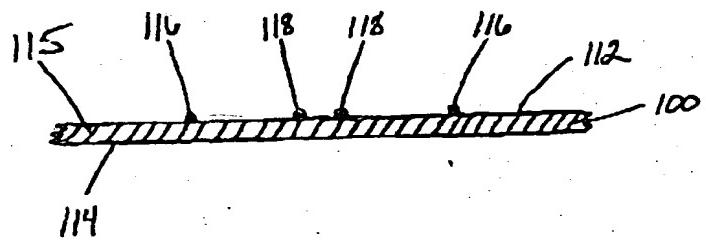


FIG. 5

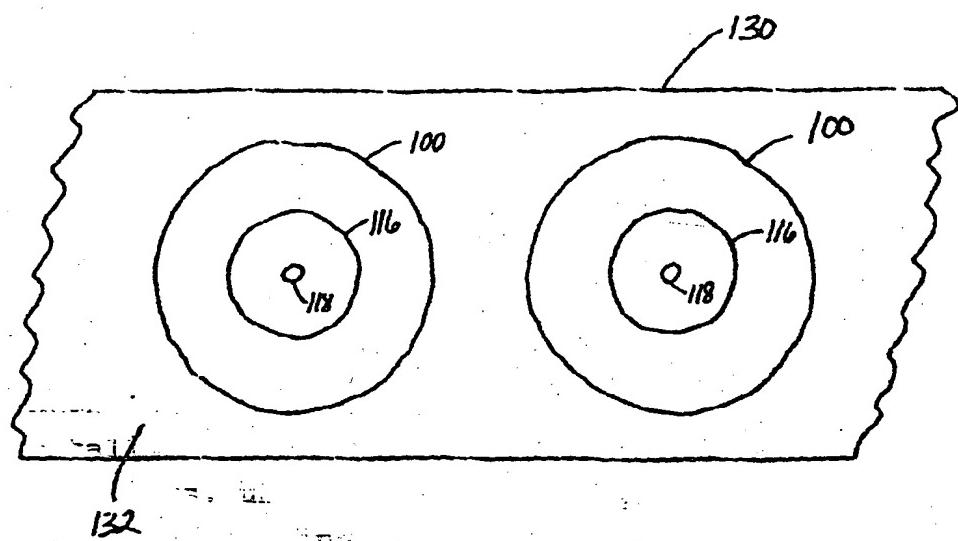


FIG. 6

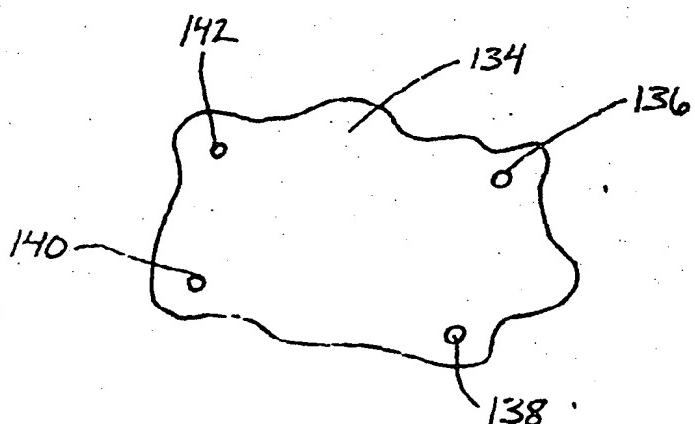
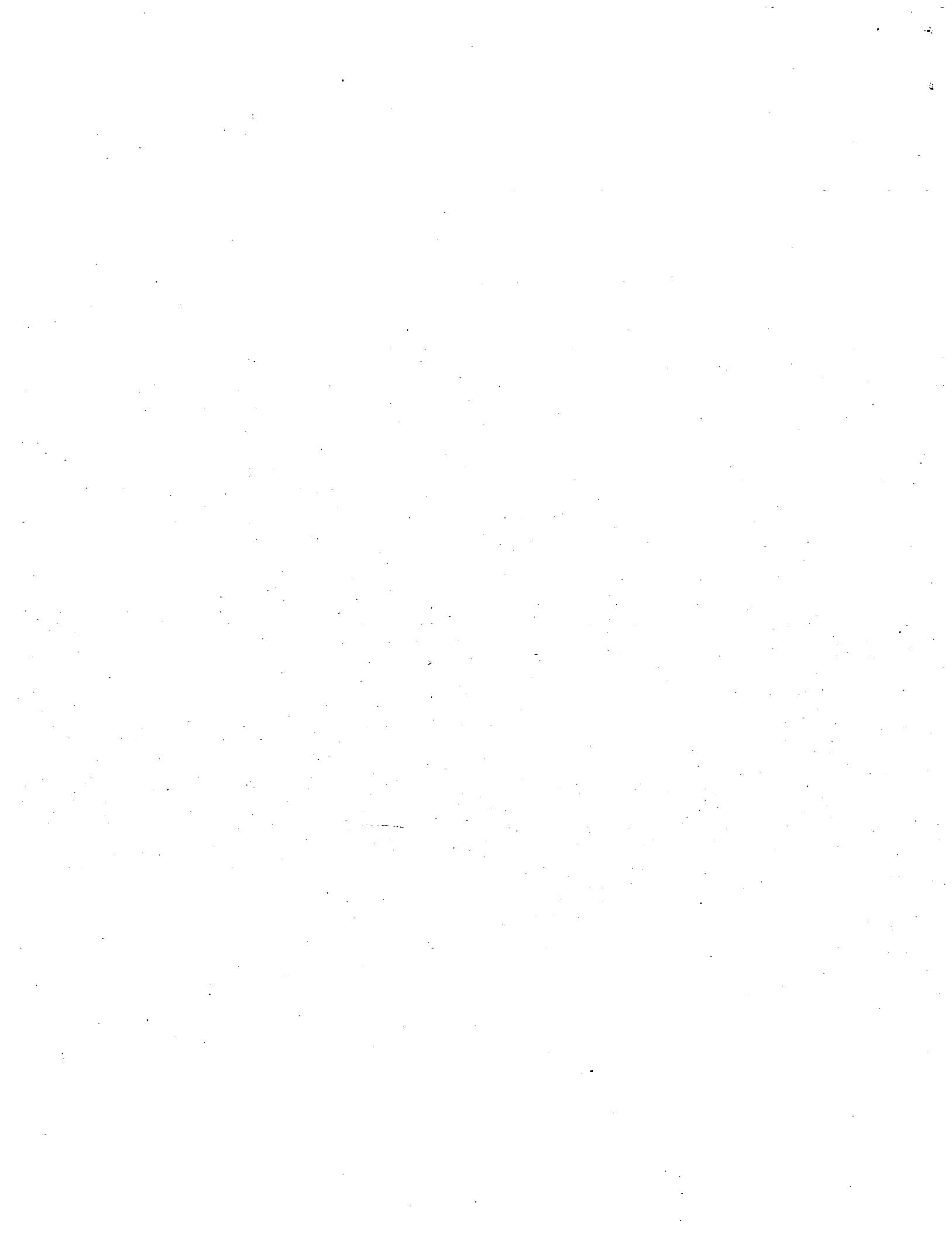


FIG. 7





(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 025 911 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
11.09.2002 Bulletin 2002/37

(51) Int Cl. 7: B05B 15/04

(43) Date of publication A2:
09.08.2000 Bulletin 2000/32

(21) Application number: 00300857.0

(22) Date of filing: 03.02.2000

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 03.02.1999 US 243925

(71) Applicant: Epsi-Engineered Products & Services
Inc.
Brookfield, Wisconsin 53005 (US)

(72) Inventor: Sarajian, Kissak T.
Glendale, CA 91202 (US)

(74) Representative: Gillam, Francis Cyril
SANDERSON & CO.
34, East Stockwell Street
Colchester Essex CO1 1ST (GB)

(54) High temperature resistant target masking devices

(57) A high temperature resistant masking device (10) comprising a substrate (15) having a top surface (12) and a bottom surface (14), with an adhesive applied to the bottom surface (14) of the substrate (15) for removable attachment of the masking device (10) to a surface to be masked. The masking device (10) includes a transparent substrate (15) with a plurality of markings (16,18) embossed or printed on the top surface of the

substrate to facilitate accurate placement and precision alignment of the masking device (10) on the masking surface. The masking devices (10) are die-cut from sheet material into various shapes and sizes, and placed on a release liner so that they may be readily applied to the surfaces of various parts requiring masking during liquid coating, powder coating, plating or electroplating.

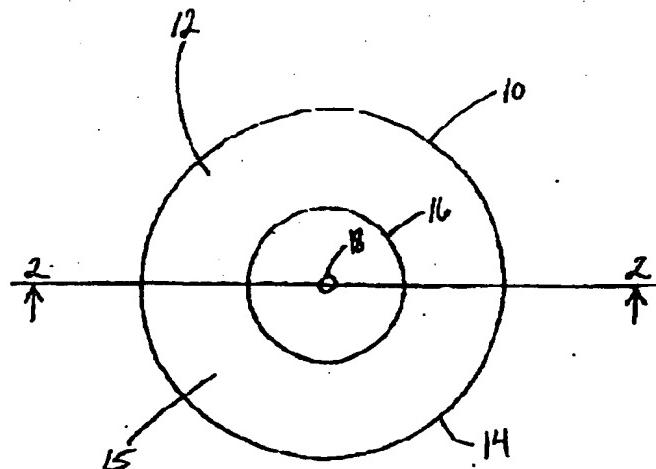


FIG. 1

EP 1 025 911 A3



Eur pean Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 00 30 0857

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 420 520 A (JONES WALLACE R ET AL) 13 December 1983 (1983-12-13)	1,3,4,10	B05B15/04
A	* column 4, line 31 - line 36 * * column 4, line 61 - column 5, line 56; figures *	11,13	
X	US 5 658 632 A (KRABILL DON L) 19 August 1997 (1997-08-19)	1,2,10	
A	* column 1, line 66 - column 2, line 34; figures *	11,12	
X	US 3 190 785 A (COMET RALPH L) 21 June 1965 (1965-06-22) * column 1, line 58 - column 2, line 6; figures *	1,11	
A	US 5 631 055 A (VINES DEGLASS M ET AL) 20 May 1997 (1997-05-20) * column 4, line 61 - column 5, line 58 * * column 8, line 17 - line 26; figures 1,3 *	1,11	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 4 917 926 A (WEINHOLD LUTZ R ET AL) 17 April 1990 (1990-04-17) * column 1, line 13 - line 35 *	6,7,15	B05B
A	US 5 113 921 A (POOL DAN B) 19 May 1992 (1992-05-19) * column 7, line 9 - line 18; figure 6 *	2,3,14	
A	EP 0 315 072 A (NIPPON CARBIDE KOGYO KK) 10 May 1989 (1989-05-10) * page 4, line 52 - line 56 * * page 6, line 22 - line 25 *	5,8,9	
		-/-	
The present search report has been drawn up for all claims			
Place of search THE HAGUE	Date of completion of the search 11 July 2002	Examiner Brévier, F	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 00 30 0857

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 4 789 579 A (TUTAS EDWARD P ET AL) 6 December 1988 (1988-12-06) * column 4, line 59 - column 5, line 2; figures *	4,11,13	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	11 July 2002	Brévier, F	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : Intermediate document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 0857

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-07-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4420520	A	13-12-1983	CA	1175305 A1	02-10-1984
US 5658632	A	19-08-1997	NONE		
US 3190785	A	22-06-1965	NONE		
US 5631055	A	20-05-1997	CA EP WO	2075631 A1 0506915 A1 9206794 A1	11-04-1992 07-10-1992 30-04-1992
US 4917926	A	17-04-1990	IE AT DE DE EP JP LU	871336 L 71649 T 3721194 A1 3867707 D1 0292304 A2 63301285 A 87069 A1	21-11-1988 15-02-1992 01-12-1988 27-02-1992 23-11-1988 08-12-1988 13-06-1988
US 5113921	A	19-05-1992	AU CA DE DE EP ES JP JP JP	2416288 A 1329174 A1 3880259 D1 3880259 T2 0315410 A1 2039641 T3 1150674 A 1975039 C 7002556 B	04-05-1989 03-05-1994 19-05-1993 16-09-1993 10-05-1989 01-10-1993 13-06-1989 27-09-1995 18-01-1995
EP 0315072	A	10-05-1989	JP JP DE DE EP ES US	1118584 A 2657965 B2 3877135 D1 3877135 T2 0315072 A2 2036655 T3 5008139 A	11-05-1989 30-09-1997 11-02-1993 19-05-1993 10-05-1989 01-06-1993 16-04-1991
US 4789579	A	06-12-1988	NONE		